March, 1998

COMPLIANCE REPORT

SOURCE EMISSION
COMPLIANCE PROGRAM
for
NON-METALLIC MINERAL PROCESSING PLANT

Prepared for:
OMYA, Inc.
61 Main Street
Proctor, Vermont 05765

Purchase Order Number: 87512

Prepared by:
Air Quality Technical Services, Inc.
18 Morse Drive
Essex Junction, Vermont 05452

Project Numbers: 981232

April 17, 1998

FOREWORD

Air Quality Technical Services, Inc., an environmental consulting company specializing in air resource management and air quality assessment, has been contracted by OMYA, Inc. to conduct a source emission compliance program at the non-metallic mineral processing facility it owns and operates in Florence, Vermont.

This report presents program results, test and analytical data, sampling and analytical methods, and other relevant data.

To the best of my knowledge the data contained herein are correct and reliable.

John J. Jasko
President

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1.0 INTRODUCTION

On September 13, 1996, the State of Vermont Agency of Natural Resources, Air Pollution Control Division (APCD), issued OMYA, Inc. (OMYA) an amended Air Pollution Control Permit (#AP-89-049d) to install and operate two new flash dryers systems, designated as Flash Dryer #1 and Flash Dryer #2, at the Verpol Plant it owns and operates in Florence, Vermont.

An Emissions Limitations section of the Permit address the discharge of air contaminants released to the atmosphere from the facility as follows:

Permit Condition (7) Visible Emission Standards (a) sets a limit on visible emissions (VE) of no greater than 7 percent opacity for fabric filter dust collectors, and, (c) requires that compliance with opacity standards be determined in accordance with Code of Federal Regulations (CFR) 40, Appendix A, Reference Method 9.

Permit Condition (8) specifies that emission concentrations of particulate matter (PM) from fabric filter dust collectors not exceed 0.01 grains per dry standard cubic foot (gr/dscf) and further limits the overall emission rates of PM from Flash Dryers #1 or #2 to 0.86 pounds per hour (lbs/hr), and states that compliance with emission limits be determined in accordance with CFR 40, Appendix A, Reference Method 5.

Permit Condition (32) requires that emission testing of the new flash dryers be conducted to demonstrate compliance with applicable emission limitations and a written report of the results be submitted within 180 days after the initial start-up date.

An initial compliance program was conducted from June 9 - 13, 1997. A second compliance was initiated October 26, 1997, with particulate emission determination, and continued November 13 and 18, 1997, with visible emission determination. At that time Flash Dryer #2 again failed to demonstrate compliance with permitted standards for particulate concentration, emission rate and opacity. Flash Dryer #2 was then re-configured to discharge to atmosphere through one stack instead of two stacks as was the case in the first two compliance programs. A third compliance program was scheduled after this modification was made.

The field portion of the ~~second~~ third compliance re-test program was performed March 26, 1998. The major on-site representatives that participated in the program and their respective affiliations were:

AQTS AIR QUALITY TECHNICAL SERVICES, INC.
18 Morse Drive, Essex Junction, Vermont 05452 (802) 879-1800

OMYA, Inc.

Neil Jordan - Environmental Engineer

State of Vermont Agency of Natural Resources, Air Pollution Control Division

Dave Manning - Environmental Technician

Air Quality Technical Services, Inc.

John Jasko - Project Director

Tim Tomasi - Environmental Technician

Simon Majahad - Environmental Technician

AQTS AIR QUALITY TECHNICAL SERVICES, INC.
18 Morse Drive, Essex Junction, Vermont 05452 (802) 879-1800

2.0 SUMMARY OF RESULTS

Particulate matter was measured as a non-filterable sample fraction collected by a filter media and preceding section of sample train. This fraction includes particulates greater than or equal to the particle cut point size of the filter media (0.3 μ).

Visible emissions were measured as the density of the plumes observed at 15 second intervals over the course of a one hour time period.

2.1 FLASH DRYER 2

2.1.1 Particulate Matter

The concentrations of PM for the three test runs conducted were 0.0019, 0.0031, and 0.0047 gr/dscf, respectively, with an average of 0.0032 gr/dscf. The corresponding emission rates of PM were 0.11, 0.18 and 0.28 lbs/hr with an average of 0.19 lbs/hr.

2.1.2 Visible Emissions

The highest average opacities determined for the highest 6 minute period during each hour of observation were 1.7, 1.3, and <1 percent.

A summary of the PM and VE test determinations for Flash Dryer 2 is presented in Table 2-1.

TEST DATA SUMMARY

FLASH DRYER 2

PARTICULATE MATTER				
Test Run	1-1	1-2	1-3	Average
Date	03/26/98	03/26/98	03/26/98	----
Clock Time (24 hour)	0921-1036	1107-1235	1315-1441	----
Test Duration (minutes)	72	72	96	----
Test Measurements				
Isokinetics (%)	106	105.7	94.6	----
Moisture Content (%)	30.1	30.1	29	29.7
Temperature (°F)	301.8	298.9	296.3	299
Gas Composition - CO_2 (%)	2	2	2	2
O_2 (%)	16.5	16.5	16.5	16.5
CO (%)	0	0	0	0
N_2 (%)	81.5	81.5	81.5	81.5
Gas Velocity (fps)	49.4	48.5	47.6	48.5
Gas Volumetric Flow (dscfm)	7028	6926	6929	6961
(acfm)	14550	14285	14020	14285
Emission Determinations				
Particulate:				
Concentration (gr/dscf)	0.0019	0.0031	0.0047	0.0032
(mg/dscm)	4.26	7.06	10.76	7.36
(lbs/dcsf)	2.66×10^{-7}	4.41×10^{-7}	6.72×10^{-7}	4.60×10^{-7}
Emission Rate (lbs/hr)	0.11	0.18	0.28	0.19

VISIBLE EMISSIONS				
Test Run	1-1	1-2	1-3	Average
Date	03/26/98	03/26/98	03/26/98	----
Clock Time (24 hour)	0922-1022	1155-1255	1400-1500	----
Emission Determinations				
Highest Average Opacity (%)	1.7	1.3	<1	----
Number of Readings >7% Limit	0	0	0	----

Table 2-1

3.0 COMPLIANCE PROCEDURES

The procedures used in the source emission compliance/evaluation programs were conducted in accordance with standard methods described in **40 CFR 60** (revised July 1, 1995), **Standards of Performance for New Stationary Sources, Appendix A - Test Methods.**

The specific EPA methods are referenced as follows:

Method 1 - Sample Velocity Traverses for Stationary Sources;
Method 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube);
Method 3 - Gas Analysis for Determination of Dry Molecular Weight;
Method 4 - Determination of Moisture Content in Stack Gas
Method 5 - Determination of Particulate Emissions form Stationary Sources;
Method 9 - Visual Determination of the Opacity of Emissions from Stationary Sources.

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18 Morse Drive, Essex Junction, Vermont 05452 (802) 879-1800

3.1 SAMPLING LOCATION

The sampling ports were positioned according to Method 1 - Sample and Velocity Traverses for Stationary Sources (40 CFR 60, App. A, pp. 489 - 495).

3.1.1 Flash Dryer #2

The inside diameter of the stack at the sample location was 30 inches. Two sample ports were located approximately 198 inches from the discharge of the ID fan and approximately 30 inches from the outlet of the stack. These dimensions place the sample ports 6.6 diameters downstream and 1.0 diameters upstream from respective flow disturbances.

In accordance with Method 1 a minimum of twenty-four sample points were required for a particulate traverse. Twelve traverse points positioned at 1.0, 2.0, 3.5, 5.3, 7.5, 10.7, 19.3, 22.5, 24.7, 26.5, 28.0 and 29.0 inches from the stack wall were sampled through each port.

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3.2 PARTICULATE

Sample collection and analysis was performed according to procedures outlined in Method 5 - Determination of Particulate Emissions from Stationary Sources (40 CFR 60, App. A, pp. 541 - 565).

A total of three test runs were conducted for the purpose of determining compliance. Each test run had a sample duration of 96 minutes and collected a volume close to or in excess of the 60 dscf required by 40 CFR Part 60, Subpart OOO for PM concentration determination (§ 60.675 Test Methods and Procedures). A sampling rate, +/- 10 percent of the isokinetic rate, was maintained over the course of each test run.

3.2.1 Sampling Apparatus

3.2.1.1 Particulate

The PM sample train consisted of:

a) a stainless steel nozzle sized to maintain isokinetic sampling;

b) a borosilicate glass-lined probe at ambient temperature;

c) an encased glass fiber filter at ambient temperature;

d) a sample/moisture condensing unit with four 500 ml glass impingers immersed in an ice water bath:

1 modified Greenburg-Smith type containing 100 ml of H_2O,

1 Greenburg-Smith type containing 100 ml of H_2O,

1 modified Greenburg-Smith type empty; and,

1 modified Greenburg-Smith type containing 200 grams of silica gel;

e) an umbilical; and,

f) a metering console with: main valve and by-pass valve for flow adjustment, leak-free pump, calibrated dry gas meter with inlet and outlet temperature gauges, calibrated orifice, and inclined manometer.

The typical sampling apparatus is depicted in Figure 3-1.

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Method 5 - Particulate Sampling Train

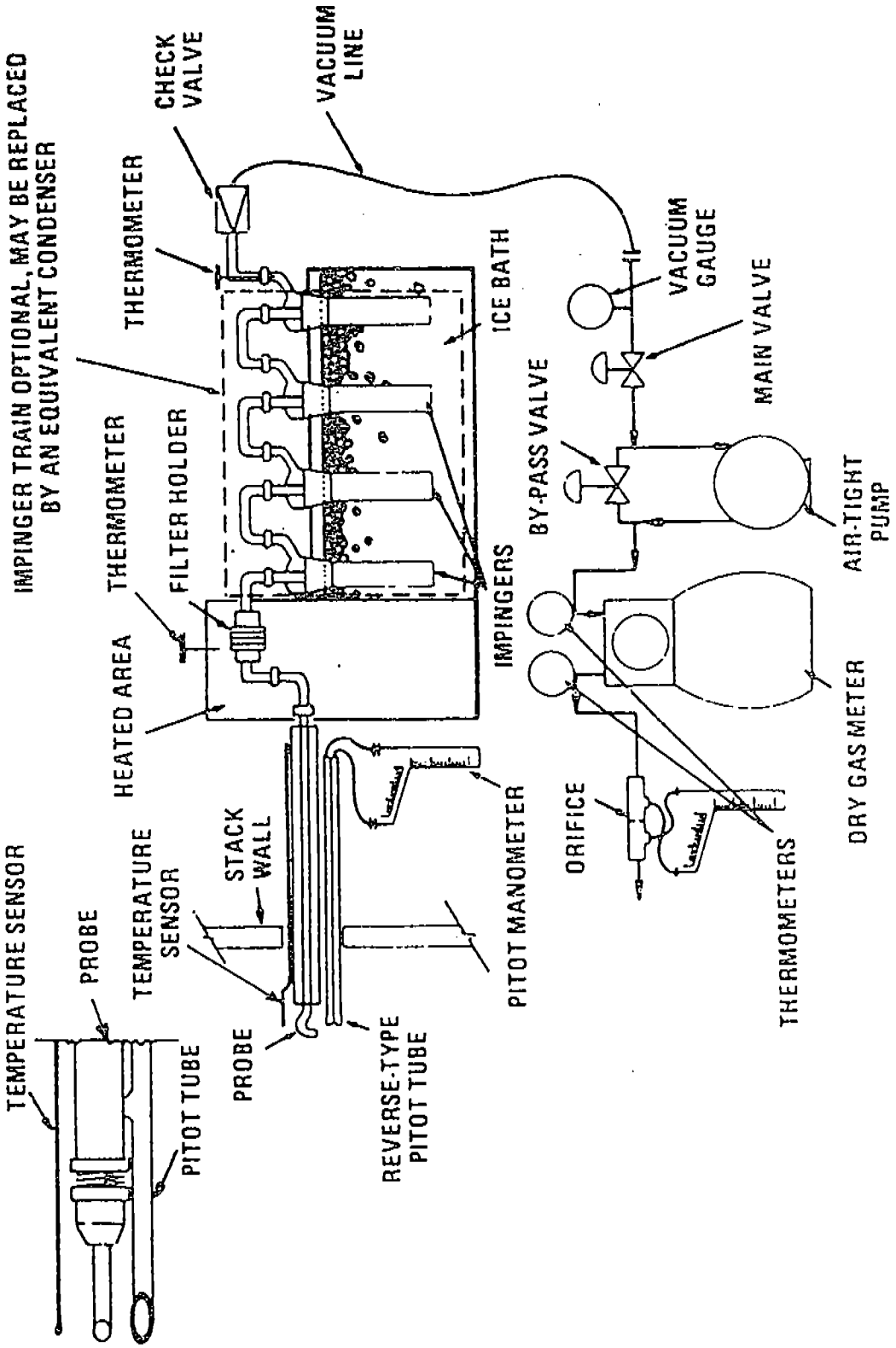

FIGURE 3 - 1

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3.2.2 Sample Recovery

3.2.2.1 Field

The samples were handled or recovered in the field using the procedures outlined below:

Filter - The filter holder was removed from the sample box, sealed, labeled for identification, and secured for transport.

Front half - The nozzle and probe were internally brushed and rinsed with acetone to remove any particulate matter which may have been deposited during a test run. The rinse was collected in a glass jar, sealed with a Teflon lined cap, labeled for identification noting the volume of the contents, and secured for transport.

Impinger catch - The volumes in the first three impingers were measured, recorded, and discarded.

Silica gel - The silica gel was transferred from the last impinger to a tared container, weighed, and the weight was recorded.

3.2.2.2 Laboratory

The samples were recovered in the laboratory using the procedures outlined below:

Filter - The filter was removed from the filter holder and placed in the original container.

Front half - The front half of the filter holder was internally brushed and rinsed with acetone, and the filter support frit gasket was scraped off under an acetone rinse to recover any adhering filter media; this rinse was combined with the front half acetone rinse collected in the field.

3.2.3 Sample Analysis

3.2.3.1 Particulate

Prior to use in the program, glass fiber filters were marked with an identifying number, desiccated for a minimum of 24 hours, weighed, re-desiccated for a minimum of 6 hours, re-weighed to establish a final constant weight (<0.5 mg difference), and, sealed in individual plastic petri dish containers that were labeled with the identifying number and tare weight of the filter.

After use in the program, the filters were placed in a dessicator, desiccated for a minimum of 24 hours, weighed, re-dessicated for a minimum of 6 hours, re-weighed to establish a final constant weight (<0.5 mg difference).

The front half acetone washes were transferred to tared beakers, evaporated, desiccated for a minimum of 24 hours, weighed, re-dessicated for a minimum of 6 hours, re-weighed to establish a final constant weight (<0.5 mg difference).

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3.3 GAS VELOCITY/VOLUMETRIC FLOW

Measurements of stack gas velocity and volumetric flow were performed according to procedures outlined in Method 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate (40 CFR 60, App. A, pp. 489 - 495).

3.3.1 Measurement Apparatus

The apparatus used to measure stack differential pressure and temperature profiles consisted of:

a) a Type S (Stausscheibe) pitot tube with an assigned design coefficient of 0.84 connected to an inclined manometer; and,

b) Type-K thermocouple probe connected to a digital pyrometer.

3.4 GAS COMPOSITION

Carbon dioxide (CO_2) and oxygen (O_2) sample collection and analyses was performed according to procedures outlined in using EPA Test Method 3 - Gas Analysis for the Determination of Dry Molecular Weight (40 CFR 60, App. A, pp. 523 - 527).

A single-point grab sample was taken and analyzed with Fyrite analyzers to measure the CO_2 and O_2 concentrations. The balance of the gas composition was considered N_2. The results were used to determine the dry molecular weight of the effluent stream.

3.5 VISIBLE EMISSIONS

Visible emission (VE) evaluation was performed according to procedures outlined in using EPA Test Method 9 - Visible Determination of the Opacity of Emissions from Stationary Sources (40 CFR 60, App. A, pp. 656 - 662).

Visible emission observations were made by a certified observer at the point of greatest opacity in that portion of the plume where condensed water vapor was not present. The observer was situated so the plume was viewed against the best available contrasting background while the sun was positioned within a 140° sector to his back. In accordance with Subpart OOO requirements the minimum distance between the observer and the emission source was 15 feet. A total of three test runs of 60 minute duration were performed. A run will consisted of 10 sets of 24 consecutive observations, recorded to the nearest 5 percent, made at 15 second intervals.

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4.0 QUALITY ASSURANCE/QUALITY CONTROL

Air Quality Technical Services, Inc. maintains a QA/QC program to ensure sampling techniques and analytical procedures are valid and data generated from test programs are accurate.

4.1 CHAIN OF CUSTODY

AQTS utilizes chain-of-custody procedures. While in the field, samples collected during each test run are sealed in appropriate sample vessels, labeled and identified by field number, and placed in secure containers. Storage containers are the responsibility of the project director or assigned personnel. Upon return to AQTS facilities, samples are logged in and assigned sample identification numbers. Samples are safely and properly stored until processed and/or shipped to an outside laboratory.

4.2 EQUIPMENT CALIBRATIONS

Dry gas meters and orifices undergo semi-annual calibration according to procedures outlined in Method 5, Section 5 - Calibration (§5.3 Metering System, §5.3.1 Calibration Prior to Use). After completion of compliance programs, dry gas meter calibrations are rechecked for accuracy according to procedures outlined in Method 5, Section 5 - Calibration (§5.3 Metering System, §5.3.2 Calibration After Use).

Prior to use in compliance programs, probe nozzles are calibrated according to procedures outlined in Method 5, Section 5 - Calibration (§5.1 Probe Nozzle).

Thermometers and barometers are calibrated according to Method 6, §5.2 and §5.4.

Prior to field use, pitot tube assemblies are checked for conformity with the design specifications listed in Method 2 (4. Calibration, §4.1 Type S Pitot Tube, §4.1.1 Type S Pitot Tube Assemblies).

Thermocouple probes undergo annual calibration according to procedures outlined in the Quality Assurance Handbook, Section 3.1 - Method 2 (§3.1.2 Calibration of Apparatus).

4.3 EQUIPMENT LEAK CHECKS

4.3.1 Particulate Sample Trains

Sample trains are leak checked according to procedures outlined in Method 5, Section 4 - Procedure (§4.1 Sampling, §4.1.4 Leak-Check Procedures). Before the start of each test run, the inlet of the probe nozzle is plugged and a vacuum of approximately 15" Hg is drawn and held. The metering dial is timed for a period of one minute and any movement during that period is noted. At the end of each test run, the same procedure is followed using the highest vacuum attained during the run. In each instance, the maximum acceptable leakage rate is 0.02 cfm.

4.3.2 Pitot Tubes

Pitot tubes are leak checked according to procedures outlined in Method 2 (§3. Procedure, §3.1). The pitot tubes are subjected to leak checks prior to and after a test run. The impact opening of a pitot is blown through until a minimum pressure of 3" H_2O registers on an inclined manometer. The impact opening is then closed off and a pressure reading observed. The reading must remain stable for a period of 15 seconds to be accepted. The same procedure is used to check the static pressure side of the pitot by applying suction to the static opening.

4.4 METHOD BLANKS

Method blanks (filters, absorbing solution, rinses, and digestion media) are handled and processed like actual samples. The blanks are weighed, evaporated, digested, and analyzed accordingly. Blanks reported greater than analytical detection levels are subtracted from sample results.

4.5 DATA REDUCTION AND HANDLING

Data are generally reported in English units, however, metric units are reported as requested by clients or regulatory agencies. The flow of data conforms to standard chain-of-custody procedures. Raw data generated from AQTS emission evaluation and compliance test programs are reduced using Lotus 1-2-3 or data acquisition systems. Calculations generally follow equations found in 40 CFR 60, Appendix A, Test Methods or other air pollution and engineering references. Spreadsheet equations and calculations are frequently verified using scientific calculators. Isokinetic tests are manually recorded on data sheets and/or

Lotus spreadsheets. Isokinetic sample rates are adjusted using a spreadsheet and/or slide rule nomograph.

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APPENDIX A

METHOD 5
PARTICULATE EQUATION FORMAT

Volume of dry gas sampled at standard conditions, 68 °F, 29.92 "Hg - Vm_{std} (scf):

$$Vm_{std} = 17.65\ (Vm)\ (Y)\ \sqrt{\frac{Pb + \frac{\Delta H}{13.6}}{Tm + 460}}$$

Stack gas moisture condensed at standard conditions - Vw_{std} (scf):

$$Vw_{std} = 0.04707\ (Vlc)$$

Decimal fraction stack gas proportion of water by volume - Bwo

$$Bwo = \frac{Vw_{std}}{Vw_{std} + Vm_{std}}$$

Stack gas dry molecular weight - MW_d (lb/lb-mole):

$$MW_d = 0.44\ (\%CO_2) + 0.32\ (\%O_2) + 0.28\ (\%N_2 + \%CO)$$

Stack gas molecular weight - MW_s (lb/lb-mole):

$$MW_s = MW_d\ (1 - Bwo) + 18\ (Bwo)$$

Pressure of stack - Ps (in. Hg):

$$Ps = Pb + (Pst/13.6)$$

Stack gas velocity at stack conditions - Vs (fps):

$$Vs = 85.49\ (Cp)\left(\sqrt{\Delta P}\right)_{avg}\sqrt{\frac{Ts + 460}{(Ps)\ (MW_s)}}$$

Stack gas volumetric flow rate at standard conditions - Qs_s (scfm):

$$Qs_s = 60\ (Vs)\ (As)\left(\frac{528}{Ts + 460}\right)\left(\frac{Ps}{29.92}\right)$$

Stack gas volumetric flow rate at actual conditions - Qs_a (acfm):

$$Qs_a = 60\ (Vs)\ (As)$$

Stack gas volumetric flow at dry standard conditions - Qs_d(dscfm):

$$Qs_d = (60)\ (1 - Bwo)\ (Vs)\ (As)\left(\frac{528}{Ts + 460}\right)\left(\frac{Ps}{29.92}\right)$$

Concentration of particulate matter in stack gas, dry basis, standard conditions - Cs (gr/dscf)

$$Cs = 15.432\left(\frac{Mp}{Vm_{std}}\right)$$

Emission rate of particulate matter, dry basis, standard conditions - ER (lbs/hr)

$$ER = 0.00857\ (Qs_d)\ (Cs)$$

Isokinetic variation - Iso (%)

$$Iso = \frac{17.33\ (Ts + 460)\left[0.04707\ (Vlc) + Vm_{std}\right]}{\theta\ (Vs)\ (Ps)\ (Dn^2)}$$

Where:

As = Cross section area of stack (ft^2)
Cp = Pitot tube coefficient
Dn = Diameter of nozzle (in.)
ΔH = Pressure differential across orifice (in. H_2O)
Mp = Mass of particulate in grams
Pb = Barometric pressure (in. Hg)
Pst = Static pressure of stack (in. H_2O)
Pstd = Standard pressure, 29.92 (in. H_2O)
ΔP = Stack differential pressure (in. H_2O)
Tm = Average temperature of dry gas meter (°F)
Ts = Average stack temperature (°F)
Tstd = Standard temperture, 68 (°F)
Vlc = Volume of liquid condensate (ml)
Vm = Volume of dry gas sample metered (ft^3)
Y = Dry gas meter correction factor
θ = Sample duration (min.)
0.00857 = Conversion factor, gr to lbs and min. to hr.
0.04707 = Conversion factor, ml to ft^3
0.264 = ratio of O_2 to N_2 in air, v/v
15.432 = Conversion factor, g/ft^3 to gr/ft^3
17.65 = Conversion factor, standard temperature and pressure
17.33 = Isokinetic constant from factoring
18 = Molecular weight of water
85.49 = Pitot tube constant

APPENDIX B

FIELD DATA TEST RESULTS

CLIENT: OMYA, INC.
FACILITY: FLORENCE, VT
PROJECT: 981232
UNIT: FLASH DRYER 2
TEST DATE: MARCH 26, 1998
TEST RUN: 1-2

TEST DATA SUMMARY

INPUT VALUES			
Pitot Coefficient - Cp:	0.84	Average Delta P (" H2O):	0.466
Nozzle Diameter - Dn (in):	0.312	Average Delta H ("H2O):	2.398
Dry Gas Meter Cal. (Y):	1.003	Stack Temperature - Ts (°F):	298.9
Stack Area (ft^2):	4.909	Meter Temperature - Tm (°F):	86.3
Barometric Press. - Pb ("Hg):	29.85	Average Square Root of Delta P:	0.679
Static Press. - Pst ("Hg):	-0.22	Mass of Particulate Collected - Mp - (g.):	0.0114
Sample Duration (min.):	72		
Volume of Gas Metered - Vm (ft^3):	58.976		
Volume of Water Condensed - Vlc (g.):	520.6		
Oxygen - O2 (%):	16.5		
Carbon Dioxide - CO2 (%):	2		
Carbon Monoxide - CO (%):	0		
Nitrogen - N2 (%):	81.5		

OUTPUT VALUES	
Dry Gas Volume (Standard) - Vmstd (dscf):	57.016
Volume of Water (Standard) - Vwstd (scf):	24.505
Stack Gas Water Proportion by Volume - Bwo:	0.301
Molecular Weight of Dry Stack Gas - MWd (lb/lb-mole):	28.98
Molecular Weight of Stack Gas - MWs (lb/lb-mole):	25.68
Pressure of Stack - Ps ("Hg.):	29.83
Velocity of Stack Gas - Vs (fps):	48.5
Dry Standard Volumetric Flow of Stack Gas - Qdscfm:	6926
Actual Volumetric Flow of Stack Gas - Qacfm:	14285
Test Isokinetic Sample Rate (%):	105.7
Particulate Concentration of Stack Gas - Cs (gr/dscf):	0.0031
Particulate Emission Rate - ER (lbs/hr):	0.18

FIELD DATA TEST RESULTS

CLIENT:	OMYA, INC.
FACILITY:	FLORENCE, VT
PROJECT:	981232
UNIT:	FLASH DRYER 2
TEST DATE:	MARCH 26, 1998
TEST RUN:	1-1

TEST DATA SUMMARY

INPUT VALUES	
Pitot Coefficient - Cp:	0.84
Nozzle Diameter - Dn (in):	0.312
Dry Gas Meter Cal. (Y):	1.003
Stack Area (ft^2):	4.909
Barometric Press. - Pb ("Hg):	29.85
Static Press. - Pst ("Hg):	-0.22
Sample Duration (min.):	72
Volume of Gas Metered - Vm (ft^3):	59.025
Volume of Water Condensed - Vlc (g.):	530.1
Oxygen - O2 (%):	16.5
Carbon Dioxide - CO2 (%):	2
Carbon Monoxide - CO (%):	0
Nitrogen - N2 (%):	81.5

Average Delta P (" H2O):	0.479
Average Delta H ("H2O):	2.423
Stack Temperature - Ts (°F):	301.8
Meter Temperature - Tm (°F):	77.8
Average Square Root of Delta P:	0.69
Mass of Particulate Collected - Mp - (g.):	0.007

OUTPUT VALUES	
Dry Gas Volume (Standard) - Vmstd (dscf):	57.966
Volume of Water (Standard) - Vwstd (scf):	24.952
Stack Gas Water Proportion by Volume - Bwo:	0.301
Molecular Weight of Dry Stack Gas - MWd (lb/lb-mole):	28.98
Molecular Weight of Stack Gas - MWs (lb/lb-mole):	25.68
Pressure of Stack - Ps ("Hg.):	29.83
Velocity of Stack Gas - Vs (fps):	49.4
Dry Standard Volumetric Flow of Stack Gas - Qdscfm:	7028
Actual Volumetric Flow of Stack Gas - Qacfm:	14550
Test Isokinetic Sample Rate (%):	106
Particulate Concentration of Stack Gas - Cs (gr/dscf):	0.0019
Particulate Emission Rate - ER (lbs/hr):	0.11

FIELD DATA TEST RESULTS

CLIENT: OMYA, INC.
FACILITY: FLORENCE, VT
PROJECT: 981232
UNIT: FLASH DRYER 2
TEST DATE: MARCH 26, 1998
TEST RUN: . 1-3

TEST DATA SUMMARY

INPUT VALUES	
Pitot Coefficient - Cp:	0.84
Nozzle Diameter - Dn (in):	0.3125
Dry Gas Meter Cal. (Y):	1.003
Stack Area (ft^2):	4.909
Barometric Press. - Pb ("Hg):	29.85
Static Press. - Pst ("Hg):	-0.22
Sample Duration (min.):	96
Volume of Gas Metered - Vm (ft^3):	70.802
Volume of Water Condensed - Vlc (g.):	591.8
Oxygen - O2 (%):	16.5
Carbon Dioxide - CO2 (%):	2
Carbon Monoxide - CO (%):	0
Nitrogen - N2 (%):	81.5

Average Delta P (" H2O):	0.45
Average Delta H ("H2O):	1.94
Stack Temperature - Ts (°F):	296.3
Meter Temperature - Tm (°F):	87.7
Average Square Root of Delta P:	0.668
Mass of Particulate Collected - Mp - (g.):	0.0208

OUTPUT VALUES	
Dry Gas Volume (Standard) - Vmstd (dscf):	68.274
Volume of Water (Standard) - Vwstd (scf):	27.856
Stack Gas Water Proportion by Volume - Bwo:	0.29
Molecular Weight of Dry Stack Gas - MWd (lb/lb-mole):	28.98
Molecular Weight of Stack Gas - MWs (lb/lb-mole):	25.8
Pressure of Stack - Ps ("Hg.):	29.83
Velocity of Stack Gas - Vs (fps):	47.6
Dry Standard Volumetric Flow of Stack Gas - Qdscfm:	6929
Actual Volumetric Flow of Stack Gas - Qacfm:	14020
Test Isokinetic Sample Rate (%):	94.6
Particulate Concentration of Stack Gas - Cs (gr/dscf):	0.0047
Particulate Emission Rate - ER (lbs/hr):	0.28

APPENDIX C

OMYA, INC., FLORENCE, VT

PROJECT: 981232

FLASH DRYER #2

PARTICULATE CONCENTRATION AND EMISSION DATA

SAMPLE ID	TEST RUN	GROSS SAMPLE MASS (g)	NET SAMPLE MASS (g)	AIR VOLUME SAMPLED (dscf)	EMISSION CONCENTRATIONS			VOLUMETRIC AIR FLOW (dscfm)	EMISSION RATE (lbs/hr)
					(gr/dscf)	(mg/dscm)	(lbs/dscf)		
C762/C763	1-1	0.0079	0.0070	57.966	0.0019	4.26	2.66E-07	7028	0.11
C764/C765	1-2	0.0123	0.0114	57.016	0.0031	7.06	4.41E-07	6926	0.18
C766/C767	1-3	0.0217	0.0208	68.274	0.0047	10.76	6.72E-07	6929	0.28
C769	BLANK	0.0009							
AVERAGES					0.0032	7.36	4.60E-07	6961	0.19

APPENDIX D

ISOKINETIC STACK CALCULATOR

(Revised 06/03/96)

INPUT PARAMETERS	
PITOT COEFFICIENT (Cp):	0.84
METER TEMPERATURE (°F):	70
STACK TEMPERATURE (°F):	300
AVERAGE DELTA P ("H2O):	0.52
MAXIMUM DELTA P ("H2O):	0.64
ESTIMATED MOISTURE (%):	23
METER BOX NUMBER:	1284-239
DELTA H @:	1.949

NOZZLE DIAMETER (Dn) DATA	
CALCULATED DIAMETER (in.):	0.2901
SELECTED SIZE (in.):	0.312

CALCULATED PARAMETERS	
K FACTOR =	5.0164
ISOKINETIC DELTA H ("H2O) =	2.61
MAX DELTA H ("H2O) =	3.21

SAMPLING PARAMETERS	
MIMIMUM SAMPLE VOLUME REQUIRED (dscf):	60
SAMPLE TIME REQUIRED (min):	78
SAMPLE RATE > 0.75 CFM	0.87
MAX SAMPLE RATE > 0.75 cfm:	0.96

PROJECT NUMBER: 981232

TEST RUN NUMBER: 1-1

METHOD 5

CLIENT: OMYA, INC.
FACILITY: FLORENCE, VT
PROJECT: 981232
UNIT: FLASH DRYER 2
TEST DATE: MARCH 26, 1998
TEST RUN: 1-1

Run Clock Time (24-Hr.):
Sample Duration (min.): 72
Number of Sample Points: 24

Barometric Press. - Pb ("Hg):	29.85
Static Press. - Pst ("H2O):	-0.22
Stack Press. - Ps ("Hg.):	29.83
Pitot Coefficient - Cp:	0.84
Nozzle Number:	A-5
Nozzle Diameter - Dn (in):	0.312
Meter Box Number:	1284-239
Dry Gas Meter Cal. (Y):	1.003
Stack area (ft^2):	4.909
Filter Number(s):	110-781

Impinger Volume (ml)	Initial	Final
1>	100	334
2>	100	282
3>	0	96
Silica Gel (g)	**Initial**	**Final**
4>	200	218.1
Total Volume>		530.1

Pitot Leak Checks		
Pre-test:	Positive	OK
	Negative	OK
Post-test:	Positive	OK
	Negative	OK

Vacuum Leak Check	Leak Rate (cf.)	Vacuum ("Hg.)
Pre-test:	0.004	15
Post-test:	0.016	11

Gas Composition	
O2	16.5
CO2	2
CO	0
N2	81.5

SAMPLE POINT	CLOCK TIME (24 Hr)	GAS METER READING (cf)	DELTA P (In. H20)	DESIRED DELTA H (In. H20)	ACTUAL DELTA H (In. H20)	TEMPERATURES (°F) STACK	DRY GAS METER INLET	DRY GAS METER OUTLET	SQUARE ROOT DELTA P	PERCENT ISO
A1	09:21	345.483	0.5	2.51	2.5	300	72	53	0.707	100.5
2	09:24	347.99	0.53	2.66	2.7	304	83	55	0.728	98.8
3	09:27	350.55	0.53	2.66	2.7	307	86	56	0.728	99.4
4	09:30	353.13	0.55	2.76	2.8	305	88	58	0.742	98.9
5	09:33	355.76	0.53	2.66	2.7	304	89	59	0.728	99.4
6	09:36	358.36	0.53	2.66	2.7	302	88	61	0.728	103
7	09:39	361.06	0.52	2.61	2.65	302	90	62	0.721	94.8
8	09:42	363.53	0.48	2.41	2.4	303	91	63	0.693	98.5
9	09:45	366	0.44	2.21	2.2	304	90	64	0.663	97.6
10	09:48	368.34	0.43	2.16	2.15	304	89	65	0.656	98.6
11	09:51	370.68	0.42	2.11	2.1	303	89	65	0.648	97.6
12	09:54	372.97	0.38	1.91	1.95	297	89	65	0.616	98.9
END	09:57	375.185								
B1	10:00	375.185	0.54	2.71	2.75	296	84	65	0.735	99.2
2	10:03	377.82	0.55	2.76	2.8	301	91	66	0.742	98
3	10:06	380.46	0.55	2.76	2.8	303	94	66	0.742	97.9
4	10:09	383.1	0.56	2.81	2.85	305	96	67	0.748	98.1
5	10:12	385.77	0.54	2.71	2.75	306	100	67	0.735	98
6	10:15	388.4	0.52	2.61	2.65	303	99	69	0.721	63.2
7	10:18	390.07	0.47	2.36	2.35	303	100	69	0.686	132.3
8	10:21	393.4	0.43	2.16	2.15	300	99	69	0.656	97.5
9	10:24	395.75	0.43	2.16	2.15	299	97	70	0.656	97.1
10	10:27	398.09	0.4	2.01	2	300	97	70	0.632	96.9
11	10:30	400.34	0.35	1.76	1.75	296	95	69	0.592	96.5
12	10:33	402.44	0.32	1.61	1.6	295	94	70	0.566	99.3
END	10:36	404.508								

ISOKINETIC STACK CALCULATOR

(Revised 06/03/96)

INPUT PARAMETERS	
PITOT COEFFICIENT (Cp):	0.84
METER TEMPERATURE (°F):	70
STACK TEMPERATURE (°F):	300
AVERAGE DELTA P ("H2O):	0.52
MAXIMUM DELTA P ("H2O):	0.64
ESTIMATED MOISTURE (%):	23
METER BOX NUMBER:	1284-239
DELTA H @:	1.949

NOZZLE DIAMETER (Dn) DATA	
CALCULATED DIAMETER (in.):	0.2901
SELECTED SIZE (in.):	0.312

CALCULATED PARAMETERS	
K FACTOR =	5.0164
ISOKINETIC DELTA H ("H2O) =	2.61
MAX DELTA H ("H2O) =	3.21

SAMPLING PARAMETERS	
MIMIMUM SAMPLE VOLUME REQUIRED (dscf):	60
SAMPLE TIME REQUIRED (min):	78
SAMPLE RATE > 0.75 CFM	0.87
MAX SAMPLE RATE > 0.75 cfm:	0.96

PROJECT NUMBER: 981232
TEST RUN NUMBER: 1-2

METHOD 5

CLIENT: OMYA, INC.
FACILITY: FLORENCE, VT
PROJECT: 981232
UNIT: FLASH DRYER 2
TEST DATE: MARCH 26, 1998
TEST RUN: 1-2

Barometric Press. - Pb ("Hg):	29.85
Static Press. - Pst ("H2O):	-0.22
Stack Press. - Ps ("Hg.):	29.83
Pitot Coefficient - Cp:	0.84
Nozzle Number:	B-5
Nozzle Diameter - Dn (in):	0.312
Meter Box Number:	1284-239
Dry Gas Meter Cal. (Y):	1.003
Stack area (ft²):	4.909
Filter Number(s):	110-782

Run Clock Time (24-Hr.):	72
Sample Duration (min.):	24
Number of Sample Points:	

Impinger Volume (ml)	Initial	Final
1>	100	380
2>	100	306
3>	0	18
Silica Gel (g)	**Initial**	**Final**
4>	200	216.6
Total Volume>		520.6

Gas Composition	
O2	16.5
CO2	2
CO	0
N2	81.5

Pitot Leak Checks		
Pre-test:	Positive	OK
	Negative	OK
Post-test:	Positive	OK
	Negative	OK

Vacuum Leak Check	Leak Rate (cf.)	Vacuum ("Hg.)
Pre-test:	0.003	15
Post-test:	0.01	15

SAMPLE POINT	CLOCK TIME (24 Hr)	GAS METER READING (cf)	DELTA P (In. H20)	DESIRED DELTA H (In. H20)	ACTUAL DELTA H (In. H20)	TEMPERATURES (°F) STACK	DRY GAS METER INLET	DRY GAS METER OUTLET	SQUARE ROOT DELTA P	PERCENT ISO
A1	11:07	405.225	0.5	2.51	2.5	305	84	63	0.707	100.3
2	11:10	407.77	0.58	2.91	2.9	305	99	66	0.762	111.9
	11:13-11:14	410.22/411.434								
3	11:28-11:30	-411.901/413.8	0.6	3.01	3.05	304	99	67	0.775	103.2
4	11:28-11:30	413.8	0.55	2.76	2.8	305	107	70	0.742	95.4
5	11:33	416.41	0.53	2.66	2.7	306	108	71	0.728	97.5
6	11:36	419.03	0.48	2.41	2.4	305	104	73	0.693	97
7	11:39	421.51	0.46	2.31	2.3	301	102	74	0.678	97.3
8	11:42	423.95	0.43	2.16	2.15	300	100	74	0.656	96.9
9	11:45	426.3	0.39	1.96	2	297	99	74	0.624	97.9
10	11:48	428.56	0.33	1.66	1.65	285	97	74	0.574	97.2
11	11:51	430.64	0.28	1.4	1.4	279	96	74	0.529	99
12	11:54	432.6	0.28	1.4	1.4	276	95	74	0.529	92.9
END	11:57	434.441								
B1	11:59	434.441	0.52	2.61	2.65	302	92	73	0.721	97.5
2	12:02	437.01	0.56	2.81	2.85	301	100	74	0.748	97.5
3	12:05	439.7	0.54	2.71	2.85	301	101	74	0.735	97.3
4	12:08	442.34	0.56	2.81	2.95	301	103	75	0.748	99
5	12:11	445.08	0.54	2.71	2.85	302	102	76	0.735	98.2
6	12:14	447.75	0.52	2.61	2.75	305	102	75	0.721	98.9
7	12:17	450.38	0.5	2.51	2.7	306	102	76	0.707	100.4
8	12:20	453	0.48	2.41	2.5	306	101	76	0.693	99.4
9	12:23	455.54	0.48	2.41	2.5	304	100	76	0.693	97.4
10	12:26	458.03	0.42	2.11	2.2	297	100	76	0.648	99
11	12:29	460.41	0.36	1.81	1.9	291	98	76	0.6	99.9
12	12:32	462.64	0.3	1.5	1.6	290	96	75	0.548	99.6
		464.668								

METHOD 5

CLIENT: OMYA, INC.
FACILITY: FLORENCE, VT
PROJECT: 981232
UNIT: FLASH DRYER 2
TEST DATE: MARCH 26, 1998
TEST RUN: 1-2

Run Clock Time (24-Hr.):
Sample Duration (min.): 72
Number of Sample Points: 24

Barometric Press. - Pb ("Hg):	29.85
Static Press. - Pst ("H2O):	-0.22
Stack Press. - Ps ("Hg.):	29.83
Pitot Coefficient - Cp:	0.84
Nozzle Number:	B-5
Nozzle Diameter - Dn (in):	0.312
Meter Box Number:	1284-239
Dry Gas Meter Cal. (Y):	1.003
Stack area (ft²):	4.909
Filter Number(s):	110-782

Impinger Volume (ml)	Initial	Final
1>	100	380
2>	100	306
3>	0	18
Silica Gel (g)	**Initial**	**Final**
4>	200	216.6
Total Volume>		520.6

Pitot Leak Checks		
Pre-test:	Positive	OK
	Negative	OK
Post-test:	Positive	OK
	Negative	OK

Vacuum Leak Check	Leak Rate (cf.)	Vacuum ("Hg.)
Pre-test:	0.003	15
Post-test:	0.01	15

Gas Composition	
O2	16.5
CO2	2
CO	0
N2	81.5

SAMPLE POINT	CLOCK TIME (24 Hr)	GAS METER READING (cf)	DELTA P (In. H20)	DESIRED DELTA H (In. H20)	ACTUAL DELTA H (In. H20)	TEMPERATURES (°F) STACK	DRY GAS METER INLET	DRY GAS METER OUTLET	SQUARE ROOT DELTA P	PERCENT ISO
A1	11:07	405.225	0.5	2.51	2.5	305	84	63	0.707	100.3
2	11:10	407.77	0.58	2.91	2.9	305	99	66	0.762	111.9
3	11:13-11:14 11:28-11:30	410.22/411.434 -411.901/413.8	0.6	3.01	3.05	304	99	67	0.775	103.2
4	11:28-11:30	413.8	0.55	2.76	2.8	305	107	70	0.742	95.4
5	11:33	416.41	0.53	2.66	2.7	306	108	71	0.728	97.5
6	11:36	419.03	0.48	2.41	2.4	305	104	73	0.693	97
7	11:39	421.51	0.46	2.31	2.3	301	102	74	0.678	97.3
8	11:42	423.95	0.43	2.16	2.15	300	100	74	0.656	96.9
9	11:45	426.3	0.39	1.96	2	297	99	74	0.624	97.9
10	11:48	428.56	0.33	1.66	1.65	285	97	74	0.574	97.2
11	11:51	430.64	0.28	1.4	1.4	279	96	74	0.529	99
12	11:54	432.6	0.28	1.4	1.4	276	95	74	0.529	92.9
END	11:57	434.441								
B1	11:59	434.441	0.52	2.61	2.65	302	92	73	0.721	97.5
2	12:02	437.01	0.56	2.81	2.85	301	100	74	0.748	97.5
3	12:05	439.7	0.54	2.71	2.85	301	101	74	0.735	97.3
4	12:08	442.34	0.56	2.81	2.95	301	103	75	0.748	99
5	12:11	445.08	0.54	2.71	2.85	302	102	76	0.735	98.2
6	12:14	447.75	0.52	2.61	2.75	305	102	75	0.721	98.9
7	12:17	450.38	0.5	2.51	2.7	306	102	76	0.707	100.4
8	12:20	453	0.48	2.41	2.5	306	101	76	0.693	99.4
9	12:23	455.54	0.48	2.41	2.5	304	100	76	0.693	97.4
10	12:26	458.03	0.42	2.11	2.2	297	100	76	0.648	99
11	12:29	460.41	0.36	1.81	1.9	291	98	76	0.6	99.9
12	12:32	462.64	0.3	1.5	1.6	290	96	75	0.548	99.6
END	12:35	464.668								

ISOKINETIC STACK CALCULATOR

(Revised 06/03/96)

INPUT PARAMETERS	
PITOT COEFFICIENT (Cp):	0.84
METER TEMPERATURE (°F):	75
STACK TEMPERATURE (°F):	300
AVERAGE DELTA P ("H2O):	0.52
MAXIMUM DELTA P ("H2O):	0.64
ESTIMATED MOISTURE (%):	30
METER BOX NUMBER:	1284-239
DELTA H @:	1.949

NOZZLE DIAMETER (Dn) DATA	
CALCULATED DIAMETER (in.):	0.3006
SELECTED SIZE (in.):	0.3125

CALCULATED PARAMETERS	
K FACTOR =	4.338
ISOKINETIC DELTA H ("H2O) =	2.26
MAX DELTA H ("H2O) =	2.78

SAMPLING PARAMETERS	
MIMIMUM SAMPLE VOLUME REQUIRED (dscf):	60
SAMPLE TIME REQUIRED (min):	84
SAMPLE RATE > 0.75 CFM	0.81
MAX SAMPLE RATE > 0.75 cfm:	0.9

PROJECT NUMBER: 981232

TEST RUN NUMBER: 1-3

METHOD 5

CLIENT: OMYA, INC.
FACILITY: FLORENCE, VT
PROJECT: 981232
UNIT: FLASH DRYER 2
TEST DATE: MARCH 26, 1998
TEST RUN: 1-3

Run Clock Time (24-Hr.):
Sample Duration (min.): 96
Number of Sample Points: 24

Barometric Press. - Pb ("Hg):	29.85
Static Press. - Pst ("H2O):	-0.22
Stack Press. - Ps ("Hg.):	29.83
Pitot Coefficient - Cp:	0.84
Nozzle Number:	A-5
Nozzle Diameter - Dn (in):	0.313
Meter Box Number:	1284-239
Dry Gas Meter Cal. (Y):	1.003
Stack area (ft²):	4.909
Filter Number(s):	110-783

Impinger Volume (ml)	Initial	Final
1>	100	378
2>	100	304
3>	0	90
Silica Gel (g)	**Initial**	**Final**
4>	200	219.8
Total Volume>		591.8

Pitot Leak Checks		
Pre-test:	Positive	OK
	Negative	OK
Post-test:	Positive	OK
	Negative	OK

Vacuum Leak Check	Leak Rate (cf.)	Vacuum ("Hg.)
Pre-test:	0.016	15
Post-test:	0.015	10

Gas Composition	
O2	16.5
CO2	2
CO	0
N2	81.5

SAMPLE POINT	CLOCK TIME (24 Hr)	GAS METER READING (cf)	DELTA P (In. H20)	DESIRED DELTA H (In. H20)	ACTUAL DELTA H (In. H20)	TEMPERATURES (°F) STACK	DRY GAS METER INLET	DRY GAS METER OUTLET	SQUARE ROOT DELTA P	PERCENT ISO
A1	13:15	465.215	0.55	2.39	2.4	200	77	64	0.742	93.9
2	13:18	468.52	0.5	2.17	2.2	301	87	64	0.707	98.6
3	13:21	471.63	0.53	2.3	2.4	301	95	66	0.728	97.4
4	13:24	474.82	0.55	2.39	2.3	302	99	67	0.742	97.5
5	13:27	478.09	0.53	2.3	2.2	304	99	69	0.728	96.9
6	13:30	481.28	0.5	2.17	2.1	305	103	71	0.707	97.1
7	13:33	484.4	0.48	2.08	1.95	305	106	72	0.693	96.4
8	13:36	487.45	0.45	1.95	1.8	304	105	73	0.671	96.9
9	13:39	490.42	0.41	1.78	1.65	302	105	74	0.64	97.2
10	13:42	493.27	0.38	1.65	1.6	299	103	75	0.616	98
11	13:45	496.04	0.37	1.61	1.5	296	103	76	0.608	96.5
12	13:48	498.74	0.35	1.52	1.95	295	101	76	0.592	95.8
END	13:51	501.344								
B1	14:05	501.344	0.53	2.3	2.3	296	96	75	0.728	97.8
2	14:08	504.59	0.53	2.3	2.3	304	104	76	0.728	95.8
3	14:11	507.78	0.53	2.3	2.3	304	106	77	0.728	93.5
4	14:14	510.9	0.51	2.21	2.2	303	107	77	0.714	95.1
5	14:17	514.02	0.51	2.21	2.2	301	107	79	0.714	95.1
6	14:20	517.15	0.48	2.08	2.1	303	108	79	0.693	95.5
7	14:23	520.2	0.44	1.91	1.9	304	107	78	0.663	96.1
8	14:26	523.13	0.38	1.65	1.65	303	106	79	0.616	95.9
9	14:29	525.85	0.36	1.56	1.55	301	103	79	0.6	96.8
10	14:32	528.52	0.36	1.56	1.55	298	101	80	0.6	95.9
11	14:35	531.17	0.3	1.3	1.3	293	100	79	0.548	96.1
12	14:38	533.6	0.27	1.17	1.15	287	98	79	0.52	100.2
END	14:41	536.017								

APPENDIX E

FILTER TARE WEIGHT LOG

CLIENT:	OMYA
PROJECT:	981232
FILTER TYPE:	GFF
SIZE:	110 mm

Filter Number	Date/Time Weight (g)			
110 770	7/3/96 0800	7/3/96 1400		
	0.5852	0.5852		
110 771	7/3/96 0800	7/3/96 1400		
	0.5827	0.5826		
110 772	7/3/96 0800	7/3/96 1400		
	0.5829	0.5829		
110 773	7/3/96 0800	7/3/96 1400		
	0.5849	0.5848		
110 774	7/3/96 0800	7/3/96 1400		
	0.5858	0.5857		
110 775	7/3/96 0800	7/3/96 1400		
	0.5865	0.5865		
110 776	7/3/96 0800	7/3/96 1400		
	0.5858	0.5857		
110 777	7/3/96 0800	7/3/96 1400		
	0.5829	0.5829		
110 778	7/3/96 0800	7/3/96 1400		
	0.5853	0.5852		
110 779	7/3/96 0800	7/3/96 1400		
	0.5846	0.5845		
110 780	7/3/96 0800	7/3/96 1400		
	0.5859	0.5858		
110 781	7/3/96 0800	7/3/96 1400		
	0.5883	0.5883		
110 782	7/3/96 0800	7/3/96 1400		
	0.5892	0.5892		
110 783	7/3/96 0800	7/3/96 1400		
	0.5775	0.5774		
110 784	7/3/96 0800	7/3/96 1400		
	0.5849	0.5848		
110 785	7/3/96 0800	7/3/96 1400		
	0.5771	0.577		
110 786	7/3/96 0800	7/3/96 1400		
	0.5824	0.5824		
110 787	7/3/96 0800	7/3/96 1400		
	0.578	0.5779		
110 788	7/3/96 0800	7/3/96 1400		
	0.5816	0.5817		
110 789	7/3/96 0800	7/3/96 1400		
	0.5768	0.5769		

BEAKER TARE WEIGHT LOG SHEET

Client: OMYA, Inc.
Facility: Florence, VT
Project: 981232

Beaker Number	Date/Time				
	Tare Weight (g.)				
15/E	03/27 0800	03/29 1320	03/29 2100		
	63.9701	63.9702	63.9702		
15/F	03/27 0800	03/29 1320	03/29 2100		
	65.8324	65.8317	65.8318		
15/G	03/27 0800	03/29 1320	03/29 2100		
	65.8577	65.8579	65.8579		
15/J	03/27 0800	03/29 1320			
	65.2536	65.2536			
15/K	03/27 0800	03/29 1320			
	69.7404	69.7404			

SAMPLE WEIGHT LOG SHEET

Client: OMYA, Inc.
Facility: Florence, VT
Project: 981232

Sample Number	Identification	Date/Time			
	Tare Weight (g.)	Gross Weight (g.)			
C762	GFF 110-781	04/09 1745	04/10 0700	04/11 0730	
	0.5883	0.5846	0.5846	0.5846	
C763	Beaker 15/E	04/09 1745	04/10 1630		
	63.9702	63.9817	63.9818		
C764	GFF 110-782	04/09 1745	04/10 0700	04/11 0730	
	0.5892	0.5850	0.5852	0.5852	
C765	Beaker 15/F	04/09 1745	04/10 1630	04/11 0730	
	65.8318	65.8442	65.8445	65.8445	
C766	GFF 110-783	04/09 1745	04/10 0700	04/11 0730	
	0.5774	0.5871	0.5869	0.5869	
C767	Beaker 15/J	04/09 1745	04/10 1630	04/11 0730	
	68.2536	68.2660	68.2658	68.2658	
C768	GFF 110-784	04/09 1745	04/10 0700	04/11 0730	
	0.5848	0.5852	0.5849	0.5849	
C769	Beaker 15/K	04/09 1745	04/10 1630		
	69.7404	69.7414	69.7413		

PARTICULATE LAB ANALYSIS
SUMMARY SHEET

Client: OMYA, Inc. Project Number: 981232 Test/Run: 1-1

Sample Identification

Number	Description
C762	GFF 110-781
C763	Front half acetone wash - 210 ml as processed
C769	Acetone blank - 210 ml as processed

Acetone Blank Background Data

Manufacturer: Anachemia Lot/Batch: 690120 Density: 0.7857 g/ml

C_a = Acetone blank residue concentration (mg/mg)
m_a = Mass of acetone residue after evaporation (mg)
V_a = Volume of acetone blank (ml)
ρ = Density of acetone (mg/ml)

$$C_a = m_a/(V_a \rho_a) = (\ 0.9\ )/(\ 210\ )(\ 0.0007857\ ) = 5.455 \text{ mg/mg}$$

Front Half Acetone Wash Data

W_a = Weight of acetone residue in wash (mg)
V_{aw} = Volume of acetone wash (ml)

$$W_a = C_a V_a \rho_a = (\ 5.455\ )(\ 210\ )(\ 0.0007857\ ) = 0.9 \text{ mg}$$

Acetone Wash Data

Beaker Number: 15/E

Gross Weight (g):	63.9818
Tare Weight (g):	63.9702
Blank Weight (g):	0.0009
Net Weight (g):	0.0107

Filter Data

Filter Number: 110-781

Gross Weight (g):	0.5846
Tare Weight (g):	0.5883
Net Weight (g):	-0.0037

Particulate Weight Summary

Weight of particulate in front half wash (g):	0.0107
Weight of particulate on filter (g):	-0.0037
Total weight of particulate catch (g):	0.007

PARTICULATE LAB ANALYSIS
SUMMARY SHEET

Client: OMYA, Inc. Project Number: 981232 Test/Run: 1-2

Sample Identification

Number	Description
C764	GFF 110-782
C765	Front half acetone wash - 210 ml as processed

Acetone Blank Background Data

Manufacturer: Anachemia Lot/Batch: 690120 Density: 0.7857 g/ml

C_a = Acetone blank residue concentration (mg/mg)
m_a = Mass of acetone residue after evaporation (mg)
V_a = Volume of acetone blank (ml)
ρ_a = Density of acetone (mg/ml)

$$C_a = m_a/(V_a \rho_a) = (0.9)/(210)(0.0007857) = 5.455 \text{ mg/mg}$$

Front Half Acetone Wash Data

W_a = Weight of acetone residue in wash (mg)
V_{aw} = Volume of acetone wash (ml)

$$W_a = C_a V_a \rho_a = (5.455)(210)(0.0007857) = 0.9 \text{ mg}$$

Acetone Wash Data

Beaker Number: 15/F

Gross Weight (g):	65.8445
Tare Weight (g):	65.8318
Blank Weight (g):	0.0009
Net Weight (g):	0.0118

Filter Data

Filter Number: 110-782

Gross Weight (g):	0.5852
Tare Weight (g):	0.5892
Net Weight (g):	-0.004

Particulate Weight Summary

Weight of particulate in front half wash (g):	0.0118
Weight of particulate on filter (g):	-0.0004
Total weight of particulate catch (g):	0.0114

PARTICULATE LAB ANALYSIS
SUMMARY SHEET

Client: OMYA, Inc. Project Number: 981232 Test/Run: 1-3

Sample Identification

Number	Description
C766	GFF 110-783
C767	Front half acetone wash - 210 ml as processed

Acetone Blank Background Data

Manufacturer: Anachemia Lot/Batch: 690120 Density: 0.7857 g/ml

C_a = Acetone blank residue concentration (mg/mg)
m_a = Mass of acetone residue after evaporation (mg)
V_a = Volume of acetone blank (ml)
$_a$ = Density of acetone (mg/ml)

$$C_a = m_a/(V_a \rho_a) = (0.9)/(210)(0.0007857) = 5.455 \text{ mg/mg}$$

Front Half Acetone Wash Data

W_a = Weight of acetone residue in wash (mg)
V_{aw} = Volume of acetone wash (ml)

$$W_a = C_a V_a \rho_a = (5.455)(210)(0.0007857) = 0.9 \text{ mg}$$

Acetone Wash Data

Beaker Number: 15/J

Gross Weight (g):	68.2658
Tare Weight (g):	68.2536
Blank Weight (g):	0.0009
Net Weight (g):	0.0113

Filter Data

Filter Number: 110-783

Gross Weight (g):	0.5869
Tare Weight (g):	0.5774
Net Weight (g):	0.0095

Particulate Weight Summary

Weight of particulate in front half wash (g):	0.0113
Weight of particulate on filter (g):	0.0095
Total weight of particulate catch (g):	0.0208

APPENDIX F

METER BOX CALIBRATION
(ANNUAL)

DATE: 08-Jan-98
CALIBRATED BY: John Jasko

METER BOX NUMBER: 1084-239
NEXT CAL DUE: 10-Jul-98

BAROMETRIC PRESSURE (In. Hg)	ORIFICE MANOMETER SETTING (In. H2O)	WET TEST METER VOLUME (cf)	DRY GAS METER VOLUME		TEMPERATURES				TIME (min)	Yi	DELTA H@
			INITIAL (cf)	FINAL (cf)	WET TEST METER (°F)	DRY GAS METER INLET (°F)	DRY GAS METER OUTLET (°F)	DRY GAS METER AVERAGE (°F)			
29.56	0.5	5	136.500	141.717	57.5	90 96	76 80	85.5	13.21	1.009	1.837
29.56	1.0	5	148.998	154.260	57.5	92 102	81 83	89.5	9.53	1.006	1.899
29.56	1.5	10	154.848	165.410	57.5	93 111	81 84	92.3	15.90	1.007	1.972
29.56	2.0	10	166.033	176.650	57.5	96 111	84 86	94.3	13.83	1.004	1.982
29.56	3.0	10	177.140	187.793	57.5	97 114	85 87	95.8	11.31	1.001	1.983
29.56	4.0	10	188.503	199.260	57.5	97 113	85 87	95.5	9.89	0.988	2.023
									AVERAGE	1.003	1.949

TOLERANCES FROM AVERAGE FOR Yi and DELTA H@ ARE <0.02 AND 0.20, RESPECTIVELY

Yi	Yi DIFF	DELTA H@	DELTA H@ DIFF
1.009	0.006	1.837	-0.112
1.006	0.003	1.899	-0.050
1.007	0.004	1.972	0.023
1.004	0.001	1.982	0.033
1.001	-0.002	1.983	0.034
0.988	-0.015	2.023	0.074

METER BOX CALIBRATION
(POST-TEST)

PROJECT: 981232
DATE: 27-Mar-98
CALIBRATED BY: John Jasko

METER BOX NUMBER: 1084-239
PRETEST CAL Y: 1.003

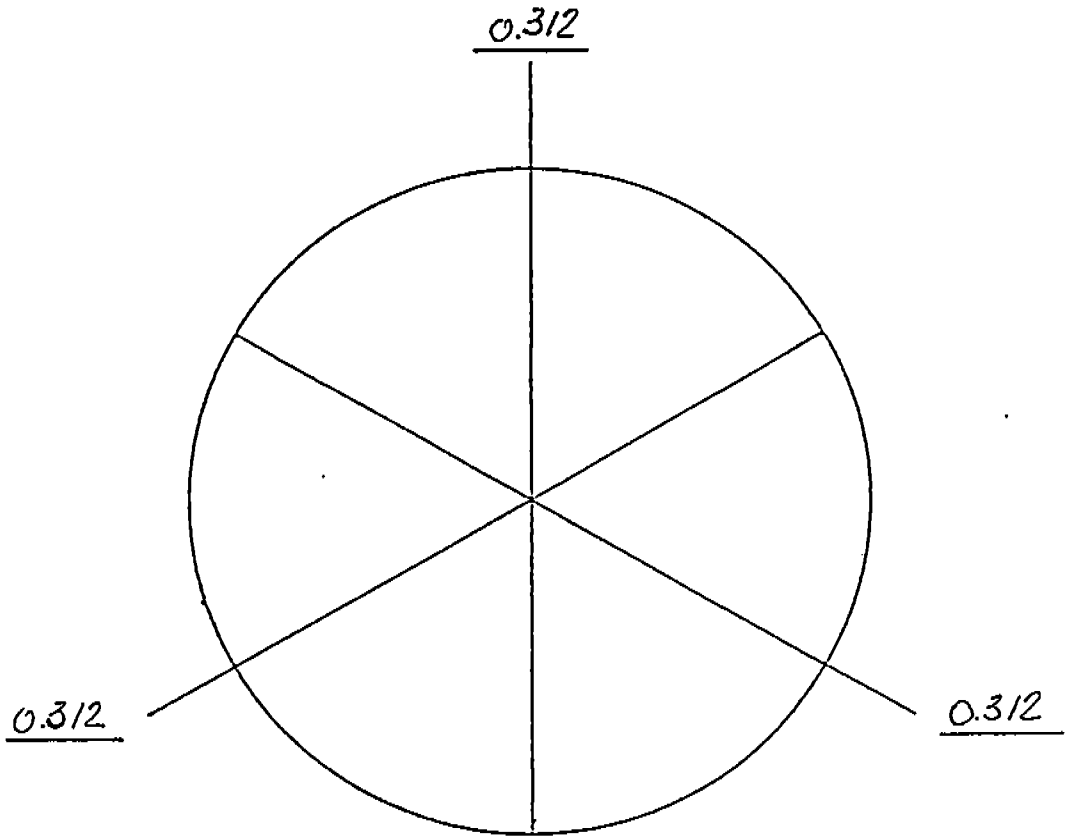
BAROMETRIC PRESSURE (In. Hg)	ORIFICE MANOMETER SETTING (In. H2O)	MAXIMUM VACUUM (In. H2O)	WET TEST METER VOLUME (cf)	DRY GAS METER VOLUME INITIAL (cf)	DRY GAS METER VOLUME FINAL (cf)	TEMPERATURES WET TEST METER (°F)	TEMPERATURES DRY GAS METER INLET (°F)	TEMPERATURES DRY GAS METER OUTLET (°F)	TEMPERATURES DRY GAS METER AVERAGE (°F)	TIME (min)	Yi
29.50	2.20	10.5	10	25.047	35.513	65.0	101 112	83 86	95.5	13.00	1.005
29.50	2.20	10.5	10	35.513	46.047	65.0	102 112	86 88	97.0	13.00	1.002
29.50	2.20	10.5	10	46.047	56.602	65.0	104 113	89 89	98.8	13.00	1.003
										AVERAGE	1.003

ACCEPTABLE VARIATION IN CALIBRATION
(Must be less than 5% of Pretest Meter Calibration)

Difference from Pretest Calibration = 0 % >>>> ACCEPTABLE

NOZZLE CALIBRATION DATA FORM

Date: O. 3/19/98 Calibrated by: [signature]

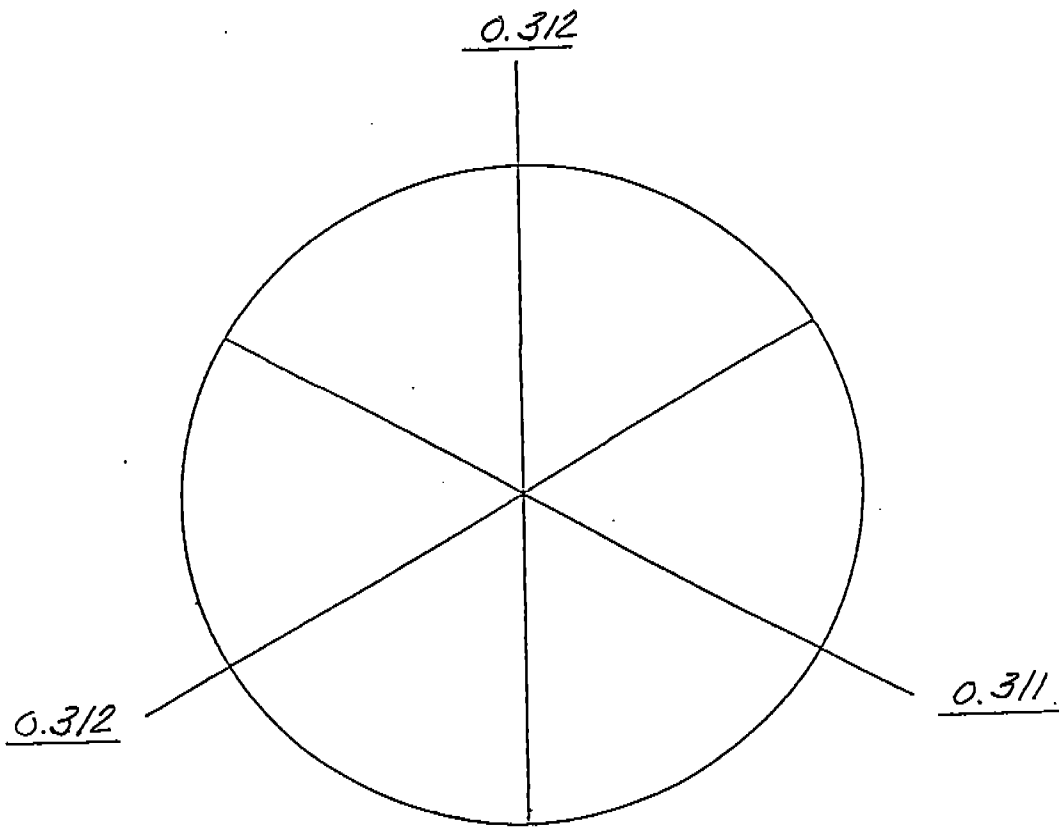


Nozzle Identification Number	Nozzle Diameter[a]			ΔD[b] mm (in.)	D_{avg}[c]
	D_1 mm (in.)	D_2 mm (in.)	D_3 mm (in.)		
B-5	0.312	0.312	0.312	0	0.312

Where:
a = nozzle diameters b = maximum difference c = average diameter

NOZZLE CALIBRATION DATA FORM

Date: 3/19/98 Calibrated by: (B)



Nozzle Identification Number	Nozzle Diameter[a]			ΔD[b] mm (in.)	D_{avg}[c]
	D_1 mm (in.)	D_2 mm (in.)	D_3 mm (in.)		
A-5	0.312	0.312	0.311	0.001	0.312

Where:
a = nozzle diameters b = maximum difference c = average diameter

REQUIREMENTS FOR ASSIGNING A CALIBRATION COEFFICIENT OF 0.84 TO AN "S" TYPE PITOT TUBE

PITOT # FE-104 DATE 3/25/98 OBSERVATIONS BY (K)

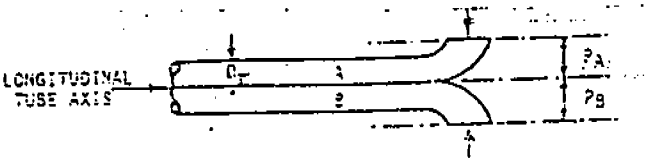
1.) All construction criteria for an isolated "S" type pitot are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

REQUIRED MEASUREMENTS

a. External tubing diameter, D_t, 0.23 in. < D_t < 0.38 in.

b. Base to plane opening Distance, P_A and P_B, 0.40 in. < P_A=P_B < 0.60 in.

D_t= 0.375
P_A= 0.49
P_B= 0.49



2.) All assembly criteria to prevent aerodynamic interference for a sampling arrangement of an "S" type pitot, nozzle and thermocouple, are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

REQUIRED MEASUREMENTS

a. External tubing diameter. See 1.a. above

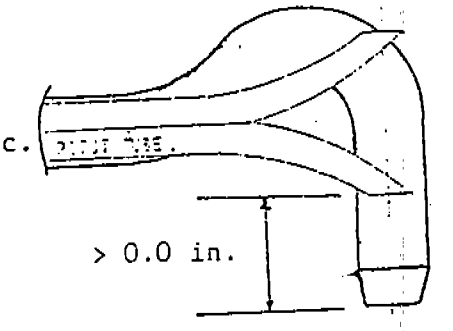
b. Pitot / nozzle separation, X, X ≥ 0.75 in. for nozzle diameter, D_n = 0.50 in.

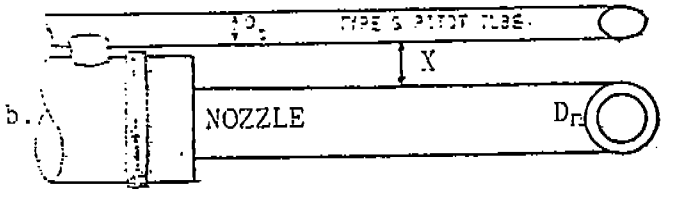
c. Plane of impact side of pitot in relation to plane of nozzle opening.

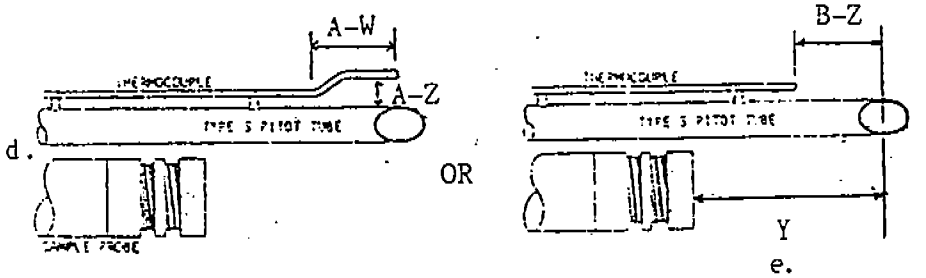
d. Thermocouple placement, Z, A-Z ≥ 0.75 in., A-W ≥ 3.0 in., B-Z ≥ 2.0 in.

e. Pitot / probe sheath distance, Y, Y ≥ 3.0 in.

D_n= 0.312
X = 1.1
Z = 2.1
Y = 3.0







REQUIREMENTS FOR ASSIGNING A BASELINE COEFFICIENT OF 0.84 TO AN "S" TYPE PITOT TUBE

PITOT # FE-103 DATE 3/25/98 OBSERVATIONS BY (R)

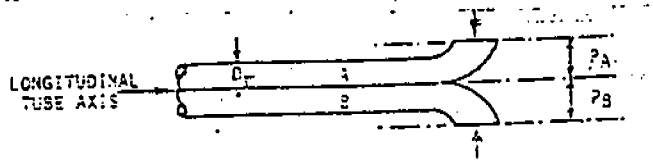
1.) All construction criteria for an isolated "S" type pitot are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

REQUIRED MEASUREMENTS

a. External tubing diameter, D_t, 0.23 in. < D_t < 0.38 in.

b. Base to plane opening Distance, P_A and P_B, 0.40 in. < P_A=P_B < 0.60 in.

D_t= 0.375
P_A= 0.49
P_B= 0.49



2.) All assembly criteria to prevent aerodynamic interference for a sampling arrangement of an "S" type pitot, nozzle and thermocouple, are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

REQUIRED MEASUREMENTS

a. External tubing diameter. See 1.a. above

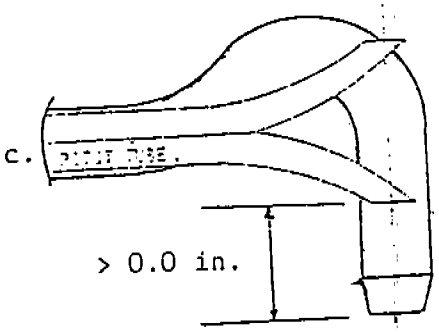
b. Pitot / nozzle separation, X, X ≥ 0.75 in. for nozzle diameter, D_n = 0.50 in.

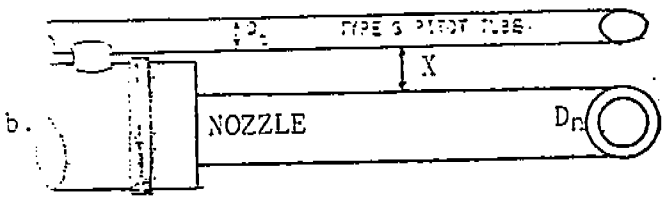
c. Plane of impact side of pitot in relation to plane of nozzle opening.

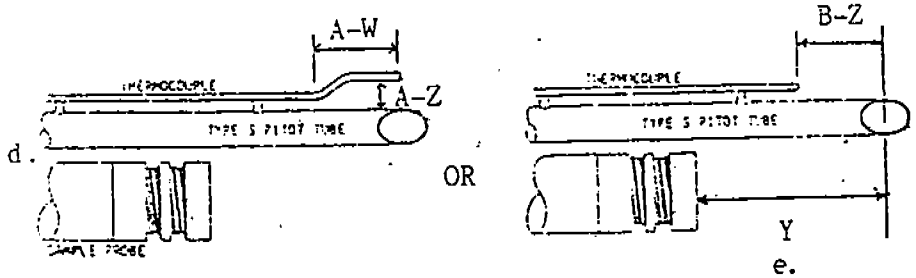
d. Thermocouple placement, Z, A-Z ≥ 0.75 in., A-W ≥ 3.0 in., B-Z ≥ 2.0 in.

e. Pitot / probe sheath distance, Y, Y ≥ 3.0 in.

D_n= 0.312
X = 1.1
Z = 2.1
Y = 3.0





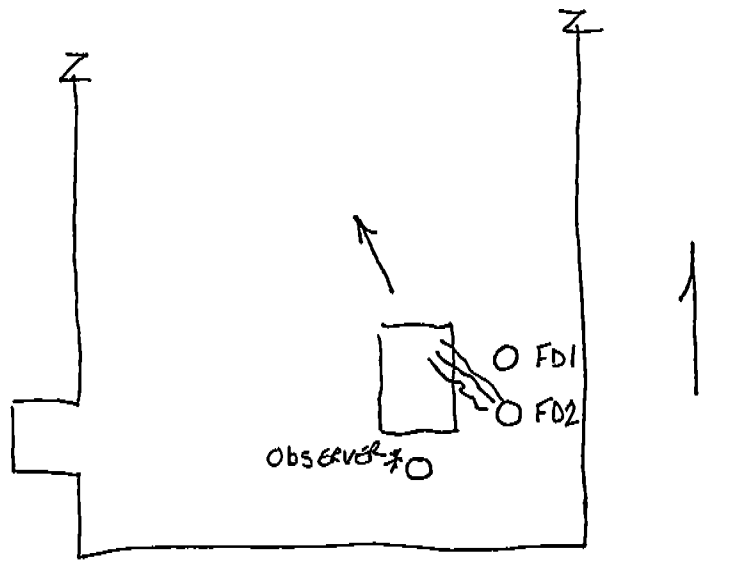


APPENDIX G

T/R 1-1

SOURCE: OMYA, INC
ADDRESS: FLORENCE ROAD
CITY: FLORENCE
STATE: VT
ZIP:
PHONE:
SOURCE ID NUMBER:
PROCESS: FLASH DRYER #2
OPERATING MODE: 8.5 TPH
CONTROL EQUIPMENT: BAGHOUSE
OPERATING MODE: CONTINUOUS
EMISSION POINT DESCRIPTION: STACK
HEIGHT ABOVE GROUND LEVEL: 10' ABOVE ROOF LEVEL
HEIGHT RELATIVE TO OBSERVER: -2'
DISTANCE FROM OBSERVER: 20'
DIRECTION FROM OBSERVER: NE
EMISSION DESCRIPTION:
EMISSION COLOR: WHITE
PLUME TYPE: DETACHED STEAM
POINT AT WHICH OPACITY WAS DETERMINED: STACK DISCHARGE
BACKGROUND DESCRIPTION: TREES
BACKGROUND COLOR: GREEN
SKY CONDITIONS: OVERCAST
WIND SPEED: LIGHT <5 mph
WIND DIRECTION: SE
AMBIENT TEMPERATURE: 35°F
WET BULB TEMPERATURE:

OBSERVATION LAYOUT SKETCH:



SUN - WIND - PLUME - NORTH -

OBSERVATION DATE: 3/26/98
START TIME: 0922
STOP TIME: 1022

SEC MIN	0	15	30	45	SEC MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	10	0	0
8	5	0	0	0	38	0	0	0	0
9	10	0	0	0	39	0	5	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	5	0	41	0	5	0	0
12	0	0	0	5	42	10	0	0	0
13	10	0	0	0	43	0	0	5	0
14	0	0	0	0	44	0	0	0	0
15	0	0	5	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	10	47	0	0	0	0
18	0	0	0	5	48	0	0	5	0
19	0	0	0	0	49	0	10	0	0
20	5	0	0	0	50	0	0	0	10
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	10
23	0	0	5	0	53	5	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	5	0
26	0	0	0	0	56	0	0	0	5
27	0	0	0	0	57	0	0	5	0
28	5	0	0	0	58	0	0	0	0
29	0	0	5	0	59	0	5	0	0
30	0	0	0	0	60	0	5	10	5

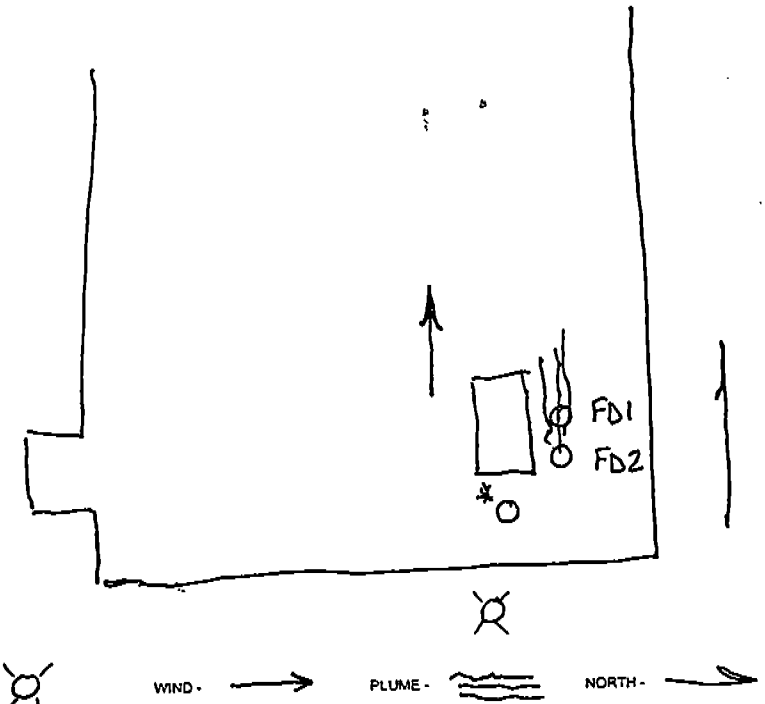
OBSERVERS NAME PRINTED: JOHN J. JASKO
OBSERVERS SIGNATURE: John J. Jasko
DATE: 3/26/98
OBSERVERS AFFILIATION: AQTS, INC.
CERTIFYING AGENCY: NHDES
CERTIFICATION DATE: 10/14/97

AVERAGE OPACITY FOR HIGHEST PERIOD: 1.9%
OPACITY LIMIT: 7%
NUMBER OF READINGS ABOVE LIMIT: 0
READING RANGE: 0 MINIMUM 10% MAXIMUM

T/R 1-2

SOURCE: OMYA
ADDRESS: FLORENCE ROAD
CITY: FLORENCE
STATE: VT
ZIP:
PHONE:
SOURCE ID NUMBER:
PROCESS: FLASH DRYER #2
OPERATING MODE: 8.5 TPH
CONTROL EQUIPMENT: BAGHOUSE
OPERATING MODE: CONTINUOUS
EMISSION POINT DESCRIPTION: STACK
HEIGHT ABOVE GROUND LEVEL: 10' ABOVE ROOF LEVEL
HEIGHT RELATIVE TO OBSERVER: -2'
DISTANCE FROM OBSERVER: 20'
DIRECTION FROM OBSERVER: NE
EMISSION DESCRIPTION: ~~STEAM~~ CALCIUM CARBONATE
EMISSION COLOR: WHITE
PLUME TYPE: DETACHED STEAM
POINT AT WHICH OPACITY WAS DETERMINED: STACK DISCHARGE
BACKGROUND DESCRIPTION: TREES
BACKGROUND COLOR: GREEN
SKY CONDITIONS: OVERCAST -
WIND SPEED: LIGHT <5 mph
WIND DIRECTION: S
AMBIENT TEMPERATURE: 45°F
WET BULB TEMPERATURE:

OBSERVATION LAYOUT SKETCH:



OBSERVATION DATE: 3/26/98
START TIME: 11:55
STOP TIME: 12:55

SEC MIN	0	15	30	45	SEC MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	5	0
3	0	0	0	0	33	5	0	5	10
4	0	0	0	0	34	5	0	0	0
5	0	0	0	5	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	5	0	0	37	0	0	5	0
8	0	0	0	0	38	5	0	0	0
9	0	0	5	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	5	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	10	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	5
16	0	0	0	0	46	0	0	5	5
17	0	0	0	5	47	0	0	0	0
18	0	0	0	5	48	0	0	10	5
19	10	5	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	5	0
21	0	0	0	0	51	5	5	0	0
22	0	0	0	0	52	5	0	0	0
23	0	0	0	0	53	0	0	5	0
24	0	0	0	0	54	0	0	0	0
25	5	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	5	0	5	59	0	5	0	5
30	5	0	5	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD: 1.3%
OPACITY LIMIT: 7%
NUMBER OF READINGS ABOVE LIMIT: 0
READING RANGE: MINIMUM 0 MAXIMUM 10%

OBSERVERS NAME PRINTED: JOHN J. JASKO
OBSERVERS SIGNATURE: John J. Jasko
DATE: 3/26/98
OBSERVERS AFFILIATION: AQTS, INC.
CERTIFYING AGENCY: NHDES
CERTIFICATION DATE: 10/14/97

M9 Visible Emissions

APPENDIX H

State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES
64 No. Main Street, P.O. Box 2033, Concord, NH 03302-2033
(603) 271-1370 FAX (603) 271-1381

October 27, 1997

Mr. John Jasko
Air Quality Technical Services Inc.
18 Morse Drive
Essex Junction, Vermont 05452

Subject: N.H. "Visible Emissions Evaluation" Session, Fall 1997

Dear Mr. Jasko:

The New Hampshire Department of Environmental Services, Air Resources Division is pleased to advise you that you have successfully completed the recent "Visible Emissions Evaluation" session held in Concord, New Hampshire on October 14 & 15, 1997. Having participated in the smoke evaluation sessions, you have met the following certification criteria:

(1) The average deviation for the sets of 25 black smoke and 25 white smoke emissions was less than 7.5%.

(2) The deviation of each reading was 15%, or less.

This certification is valid until April 15, 1998. A copy of your test sheet will be supplied upon request.

Sincerely,

Kenneth A. Colburn

Kenneth A. Colburn
Director
Air Resources Division

KAC/sec/a:\1997\fall\smoke97f.ltr